Service Training

Self-study Programme 408

Rear Seat Entertainment (RSE)

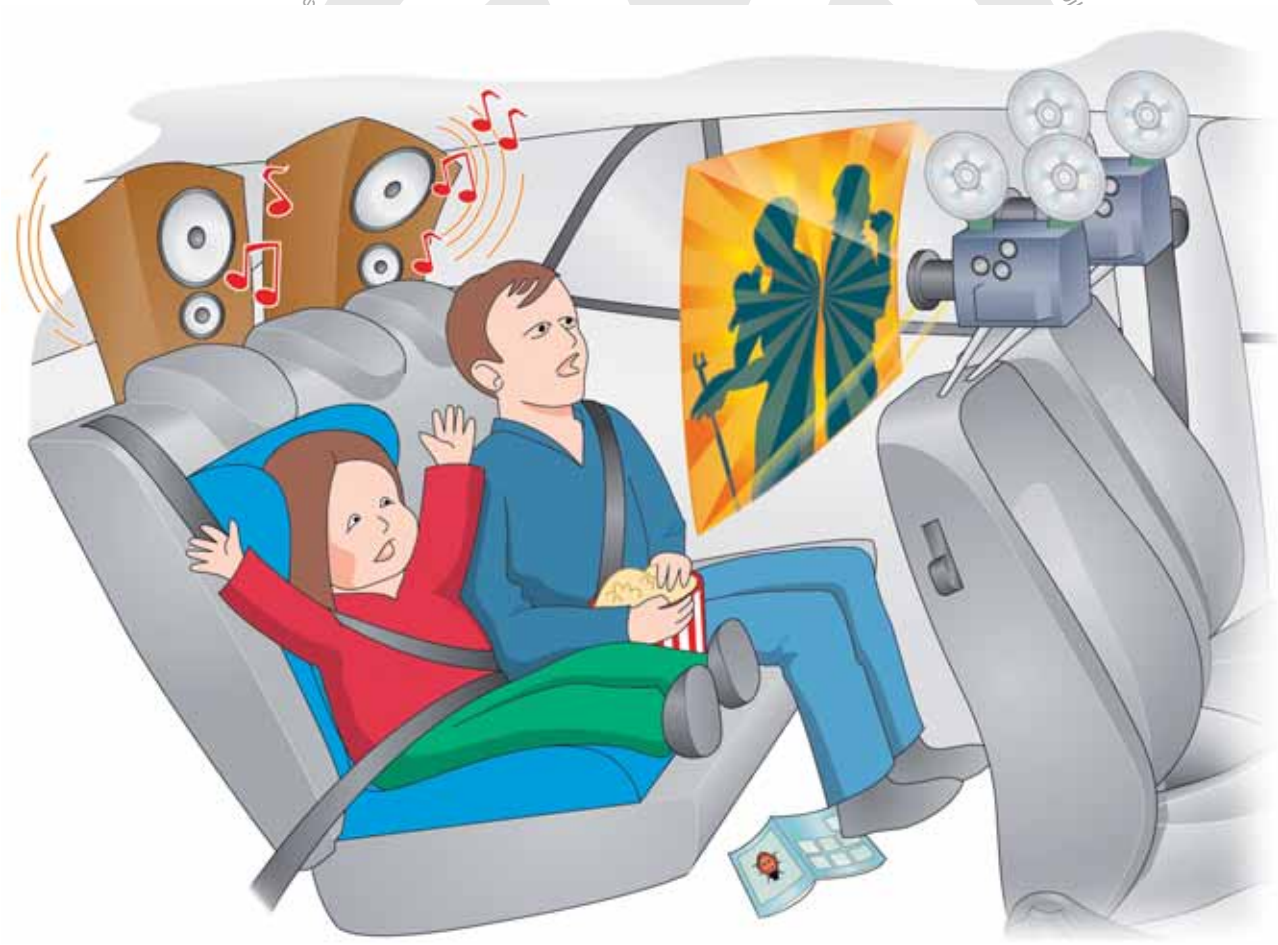
Design and Function

We are living in a multimedia age. We are confronted with modern consumer electronics in almost all areas of life and we carry electronic devices with us at all times when we go out.

People want mobility and independence and so they are spending an increasing amount of time in their cars. Long journeys, in particular, can become tedious for passengers in the back seats, however.

Rear seat entertainment is here to help. Thanks to its wide range of entertainment possibilities, it makes journeys more pleasant and entertaining for passengers.

This self-study programme describes the functions of all rear seat entertainment systems used in Volkswagen Group vehicles.



S408_002

Important Note

The self-study programme shows the design and function of new developments. The contents will not be updated.

For current testing, adjustment and repair instructions, refer to the relevant service literature.

Contents

Introduction

The history of the car radio

The desire for enjoyment is as old as humankind itself. Earlier forms of entertainment were music, dance and theatre. Centuries later, the first modern entertainment media arrived in our living rooms with the radio, gramophone and television. At the time of their launch, they revolutionised the entertainment industry.

The first mono radio came on the market in 1924. Three years later Chevrolet became the first automobile manufacturer to offer a car radio for its vehicles. Due to the size of the radio receiver, a large unit had to be accomodated in the boot. A switch was mounted on the steering column to control it.

These units were still based completely or partly on valve technology, had a volume of around 10 litres and cost almost half the price of a small car at the time. It was not until the fifties that the units became so compact that it was possible to integrate them into the dashboard.

S408_050

The first car radios were very similar to their stationary counterparts.

In the sixties, valve technology was replaced by transistors. This new space-saving technology opened many possibilities. The evolution of the car radio accelerated.

At the end of the same decade, the audio cassette and stereo sound celebrated their addition to car radios. The CD followed in the mid eighties. The first traffic news was broadcast in the early seventies.

S408_080

The audio cassette allowed most car drivers to take their favourite music with them in their car, for the first time.

S408_053

The screens grew in size allowing more and more information to be displayed.

Parallel to the car radios, the devices with screens were developed further. While the large units with cathode ray tubes were still completely unsuitable for use in cars, this changed with the arrival of LCD technology.

The first simple LCD screens were used in vehicles as early as the eighties. At the end of the decade, the first active matrix screen (AMLCD) was launched and adapted for use in vehicles over the next years.

S408_074

Full-sized LCD screens are now no longer a rarity in cars either.

Due to their compact design, TFT/LCD screens have a multitude of applications. The new technology has made it possible, for example, to integrate navigation systems in car radios. The first navigation system integrated in this way appeared in 1997.

From 2001, the built-in LCD screens were large enough to watch films on properly. They were either built directly into the car radio, separately in the headliner or in the head restraints for rear seat entertainment. VHS players were used to play the films at first.

S408_075

DVD players have long since outstripped VHS players.

DVD players/changers are mainly used today. External devices, for example, games consoles, are being used more and more and the arrival of DVB-T television has now also made good television reception possible in vehicles.

Basics

TFT/LCD screen

Modern flat screens are often called “LCD screens” or “TFT monitors”. Both expressions describe the same technology. This is why the term TFT/LCD screen is often used. LCD refers to the use of liquid crystals in the individual pixels of the screen and TFT to minute transistor elements that control the orientation of the liquid crystals and thus their light transmission.

S408_077

One of the latest TFT/LCD screens as used for rear seat entertainment.

Development

Otto Lehmann published his principle work “Liquid Crystals” back in 1904. In 1911, Charles Mauguin described the structure and the properties of liquid crystals.

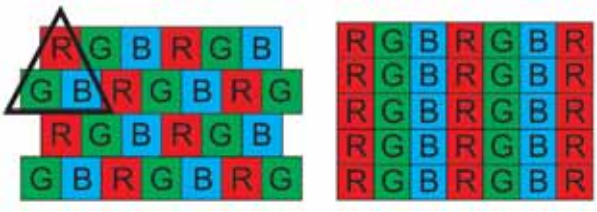
In 1936, the Marconi Wireless Telegraph Company patented the first practical application for the new technology - the liquid crystal light valve. The first functioning LCD was developed in the USA in 1968 under the guidance of George H. Heilmeier. The first active-matrix screen (AMLCD), a 3'' TFT/LCD display, followed in 1987.

Design and function

Each pixel of a TFT/LCD screen is made up of three transistors with the colour filter elements red, green and blue (RGB).

The whole colour spectrum can be depicted by mixing these three primary colours. The transistors are either triangular (delta configuration) or arranged exactly in columns and lines (vertical stripe configuration).

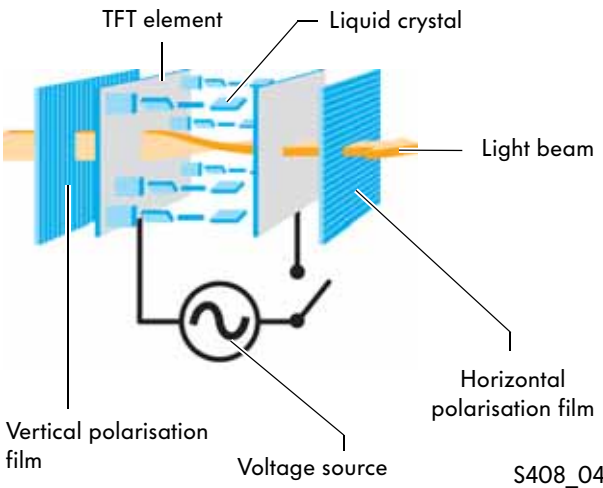
The larger the screen with the same number of pixels, the more likely you will see a zig-zag pattern in the delta configuration. For this reason, the vertical stripe configuration is used for this kind of screen.



S408_047

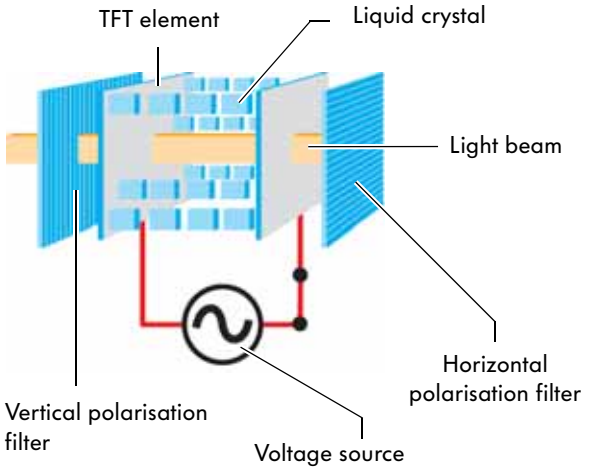
Delta and vertical stripe configuration of colour filter in TFTs/LCDs

LCD cell, light-transmitting, no voltage applied

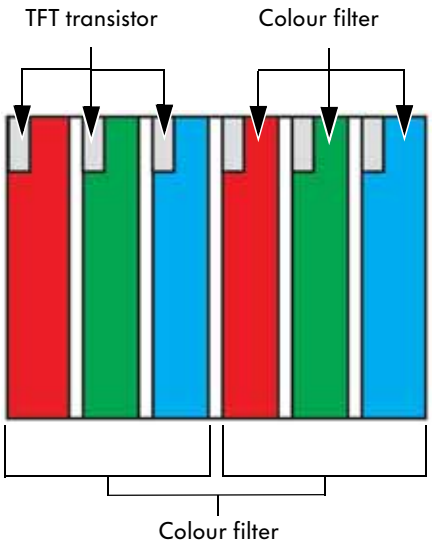


S408_044

LCD cell, non-light-transmitting, voltage applied



S408_045



S408_046

LCD screens use the optical property of liquid crystals to deflect light at a specific angle. An LCD cell is made up of two polarisation filters that are set perpendicular to each other and do not allow light to pass.

In-between them is a layer of liquid crystals that are oriented so that they turn light beams exactly 90° when not powered. The rotated light beams can pass through the second polarisation filter. The screen then becomes light in the area of this LCD cell.

When a certain voltage is applied, the liquid crystals are oriented parallel to the electrical field. This changes their emission angle so that the light is no longer turned - it can no longer pass the second polarisation filter. A reduced voltage level also allows a smaller amount of light to pass through the second polarisation filter.

By varying the voltage, the brightness of the LCD cell can be regulated steplessly. The voltage is generated on a film with transistors, which is part of each LCD cell - the TFT element.

The TFT elements do not only regulate the overall brightness, but also the colour reproduction of the picture, at the same time. The light for each pixel passes through a colour filter that consists of three colour filter elements (red, green, blue). All colours displayed by an LCD monitor are created by mixing the three primary colours red, green and blue in the colour filters.

Each colour filter element has a separately controlled transistor. A TFT with 1024 x 768 pixels therefore has exactly 3 x 1024 x 768 transistors that regulate the light transmission of each colour component.

Rear Seat Entertainment (RSE)

Functions and components

Compatible media

The DVD player or DVD changer (only Phaeton) for the RSE plays the following media and file formats:

- Media: DVD, CD, CD-R and CD-RW
- Audio formats: Audio CD, MP3s and WAV
- Video formats: VCD, SVCD in MPEG 1 format and DVD video in MPEG 2 format

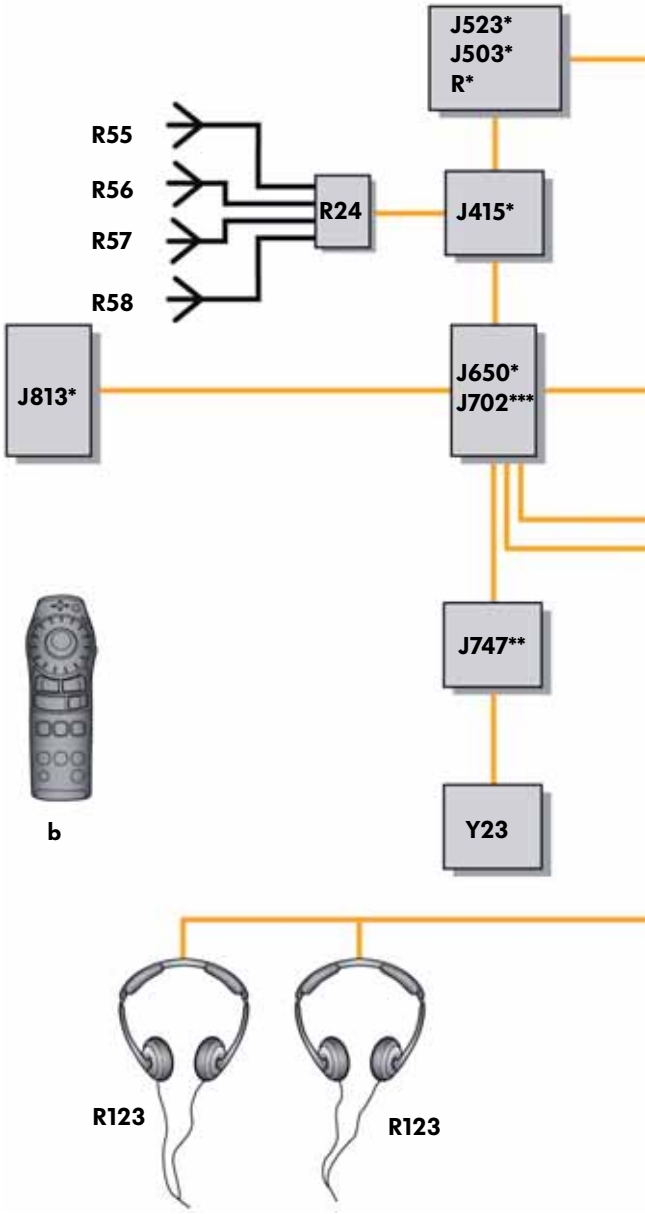
The RSE only supports these formats. If you use homemade media, playback and user-friendliness may be limited.

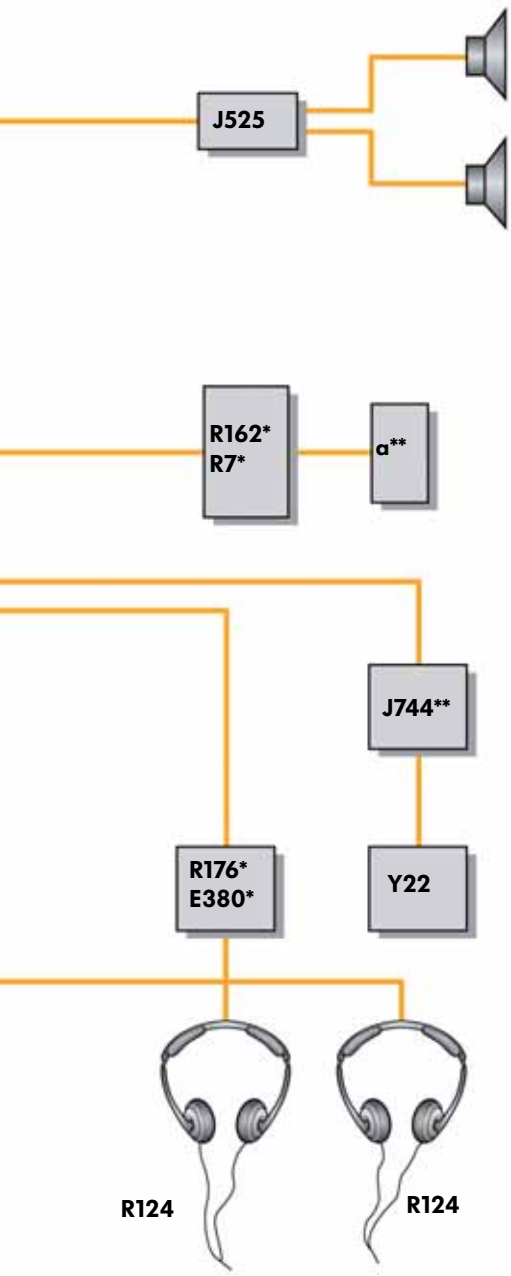
System variants

Depending on the vehicle model, two different systems are used. There are coupled and decoupled RSE systems. Coupled systems are connected to the control unit with display for radio and navigation J503 or to the radio (R). Decoupled systems are connected to the battery monitor control unit J367 (voltage monitor). Audio can be played back via the vehicle loudspeakers only with a coupled RSE system.

The coupled RSE can only be switched on if the car radio is also switched on. If the car radio is switched off, the RSE will also be switched off. The decoupled RSE can only be switched on if the ignition is switched on. If the ignition is switched off, the RSE will switch off automatically after approx. 15 minutes (depending on model).

Maximum set-up of components





S408_003

Legend:

a	Cover for DVD changer with light in boot
b	Remote control for multimedia
E380	Multimedia system operating unit
J415	Navigation system tuner for TV
J503	Control unit with display for radio and navigation
J523	Control unit for front display and information control panel
J525	Digital sound package control unit
J650	Multimedia system control unit
J702	Roof display unit
J744	Multimedia system display unit 1 control unit
J747	Multimedia system display unit 2 control unit
J813	Voltage monitoring relay
R	Radio
R7	DVD player
R24	Aerial amplifier
R55	TV aerial 1
R56	TV aerial 2
R57	TV aerial 3
R58	TV aerial 4
R123	Multimedia system headphones for left side
R124	Multimedia system headphones for right side
R162	Rear DVD changer
R176	Additional connections unit for audio and video
Y22	Multimedia system display unit 1
Y23	Multimedia system display unit 2

*	depending on model
**	only in Phaeton
***	only in Touareg

There is no diagnosis option for the RSE system using the VAS tester.

Rear Seat Entertainment (RSE)

Remote control

The infrared remote control allows you to operate all main functions of the DVD player. Its range is up to five metres. Infrared remote controls do not necessarily require direct visual contact with the unit they control since the infrared signals can be reflected from many surfaces.

Remote control of RSE

S408_004

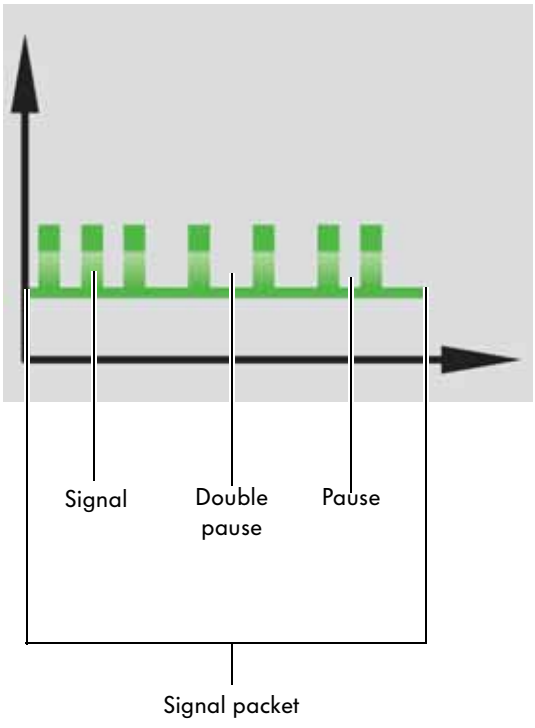
Function

The infrared remote control transmits a light signal at a frequency around 40kHz. Information is sent to the receiver by blanking the transmission signal. Like Morse code, the signals and the intervals between two signals form the code for the information that is to be transmitted to the receiver.

There are different methods for coding the signal packets. In the illustration on the right, the coding uses a variation of the signal and pause duration. A signal followed by a pause of the same length corresponds with a set bit 1. A signal followed by a pause with twice the length corresponds with a set bit 0.

Depending on the coding method, a signal packet is made up of 7 to 14 bits. With a signal packet of 7 bits, the command “volume +” would be as follows, for example: 1100010. The first one, i.e. the first bit, always stands for the so-called start bit that precedes each infrared command. It always has the value 1.

Infrared control signal



S408_024

Headphones

Headphones for RSE

S408_006

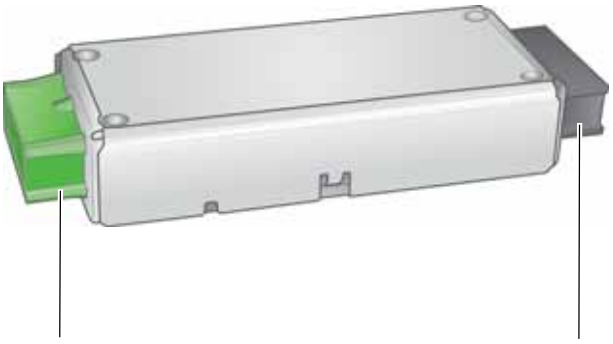
In decoupled systems, the sound is heard exclusively via the headphones. In coupled systems, the sound can be heard via the radio unit with the “CD changer” programme in addition to the headphones.

Up to four headphones can be connected depending on the model. Depending on the equipment, the headphones are connected to the RSE by cables or wirelessly via infrared technology.

The wireless version has a volume control and an on/off switch directly on the headphones. They require two “AAA” batteries. An LED shows that the headphones are working and also indicates the charge state of the batteries.

Multimedia system control unit J650

Control unit J650



S408_068

The multimedia system control unit J650 is the central unit of the RSE. It is used to connect the video sources as well as the monitors and the multimedia system operating unit E380. The voltage for the connected RSE components is supplied via this control unit.

Depending on the vehicle, the design can differ slightly. In the Touareg, these functions are integrated in the roof display unit J702.

Rear Seat Entertainment (RSE)

Golf Plus 2005/Touran 2003

Display unit Y22

The 7" LCD screen Y22 was specially designed for installation in the headliner. It has a high resolution and a wide viewing angle.

Technical data

- Picture size: 7" (17.5cm diagonal)
  Picture format: 16:9, can be switched to 4:3
- Resolution: 720 x 576 pixels (PAL) or 720 x 480 pixels (NTSC)
- Settings via on-screen display (OSD): Brightness, contrast, colour, tint (with NTSC signal), sharpness
- Operation via infrared remote control
- Dimensions (W x H x D): 179mm x 115mm x 34mm
- Temperature range: -20°C to +65°C
- Operating voltage: 9.5V - 18V
- Power consumption: 6.5W - 8.5W

Mounting locations for display unit Y22

Location in Golf Plus S408_027

Location in Touran S408_029

Display unit Y22

Switch RSE on and off

Navigation menu

- Call up main menu
- Confirm menu selection
- Save settings
- Exit menu

S408_028

Location of DVD player R7

S408_026

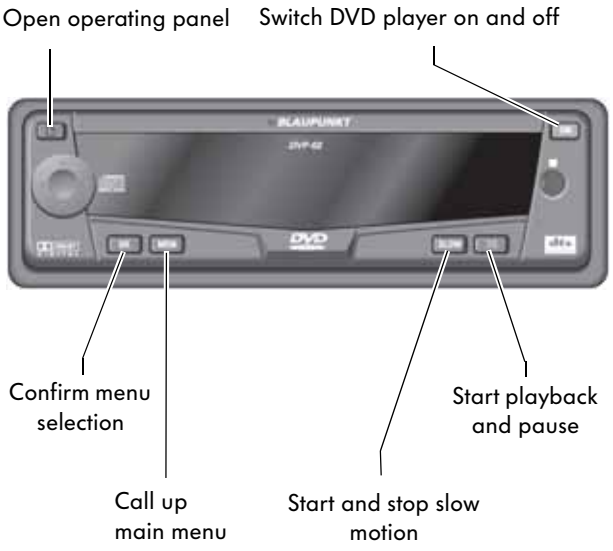
DVD player R7

The DVD player R7 in compact 1-DIN format was specially developed for mobile operation. It is not sensitive to vibrations to a great extent. It is installed in the storage compartment under the front centre armrest.

Technical data:

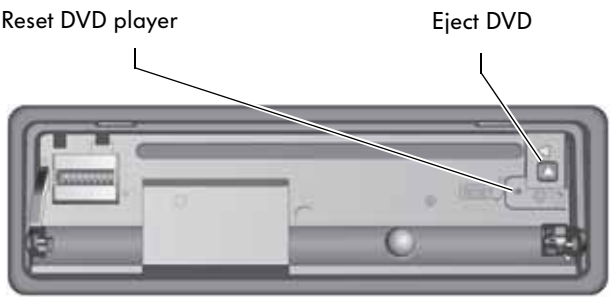
- Optical digital output
- Video and audio output
- Video and audio input
- Operated via buttons on the unit, infrared remote control or multimedia system control unit E380
- Menu guidance in four languages (D/GB/F/E)
- Removable operating panel
- PAL/NTSC switchover
- Password function (four-digit PIN code)
- Night-time design
- Anti-shock memory
- Dimensions: (1-DIN) 188 x 59 x 179mm (WxHxD)
- Temperature range: -15°C to +60°C
- Operating voltage: approx. 12V
- Power consumption: approx. 15W

DVD player R7



S408_013

DVD player without operating panel



S408_034

Rear Seat Entertainment (RSE)

Golf Plus 2005/Touran 2003

Multimedia system operating unit E380

The multimedia system operating unit E380 is the central control unit of the RSE system. From here, the basic functions of the DVD player are controlled and the data source (DVD player or AUX IN) selected.

In addition, it has an AUX IN input with Cinch sockets for external video sources.

A maximum of three conventional headphones can be connected. The volume of the individual headphones is individually adjustable.

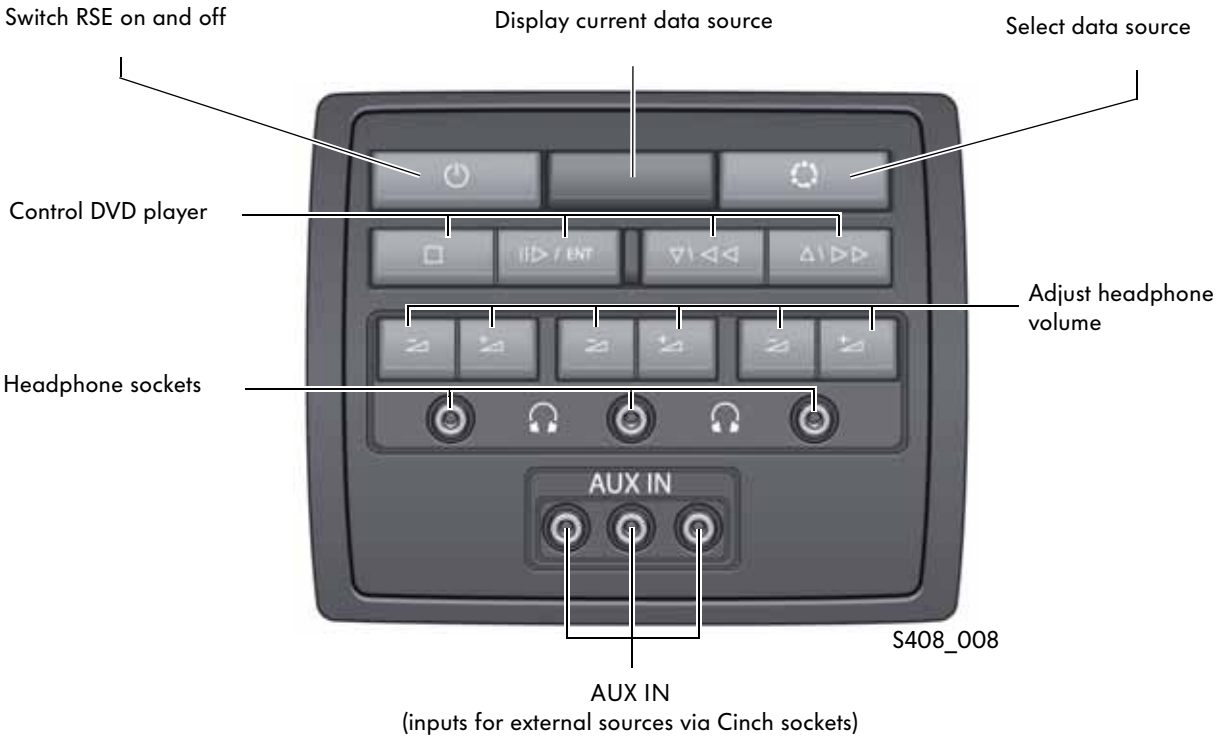
Location of operating unit E380 in Golf Plus

S408_030

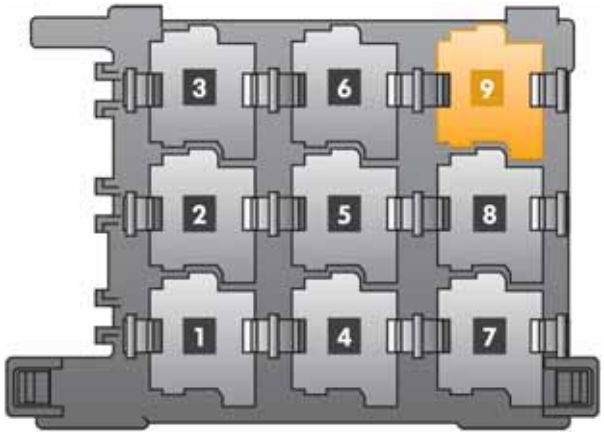
Location of operating unit E380 in Touran

S408_031

Multimedia system operating unit E380



Voltage monitoring relay J813



S408_069

Voltage monitoring relay J813 (Touran only)

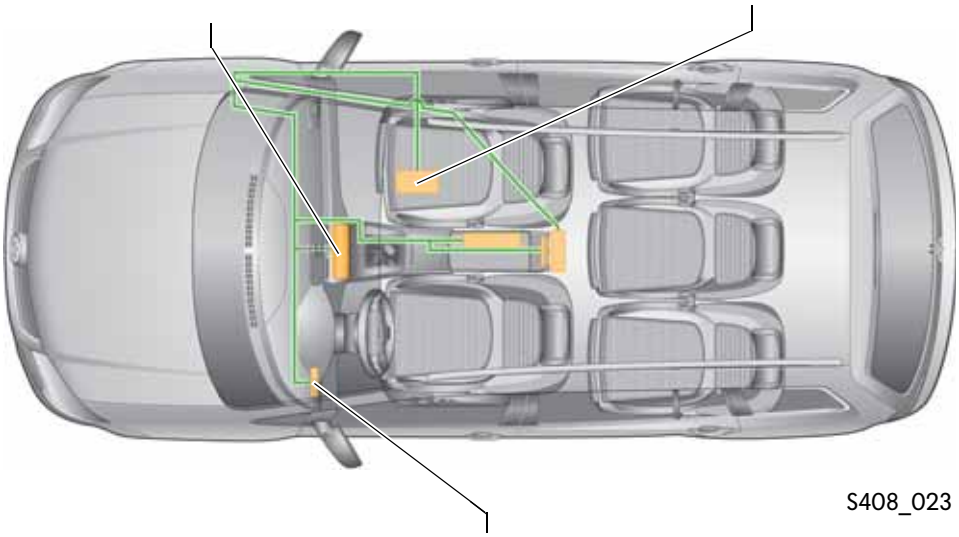
From calendar week 45/07, the voltage monitoring relay J813 is used in the Touran. At the same time, there is no coupling with the control unit with display for radio and navigation system J503 or the radio R.

At voltages below 10.7 volt, the voltage monitoring relay J813 will switch the RSE off after approx. 5 minutes. When the ignition is switched off and the RSE switched on, the RSE will be switched off after approx. 15 minutes.

Locations of control units in Touran/Golf Plus

Control unit with display for radio and navigation J503 or radio R

Multimedia system control unit J650



S408_023

Fuse box in dash panel
From calendar week 45/07 (Touran only): Voltage monitoring relay J813 (voltage monitor) and decoupling of the control unit with display for radio and navigation system J503 or radio R

The exact location of the voltage monitoring relay J813 is in the “Relay locations” circuit diagram for the Touran. All other relevant fuses are described in more detail in the “Fuse locations” circuit diagram for the Touran.

Rear Seat Entertainment (RSE)

Sharan 1996

Display units Y22/Y23

The two 7" LCD screens Y22 and Y23 (left and right front head restraints) were specially designed for installation in motor vehicles. They have a high resolution and wide viewing angle.

Technical data

- Picture size: 7" (17.5cm diagonal)
- Picture format: 16:9, can be switched to 4:3
- Resolution: 480 x 234 pixels (PAL)
- Viewing angle (top/left/right/bottom): 30°/50°/ 50°/ 40°
- Settings via on-screen display (OSD): Brightness, contrast, colour, languages
- LCD control via infrared remote control
- Dimensions (W x H x D): 167mm x 102mm x 19.4mm
- Temperature range: -30°C to +85°C
- Operating voltage: 8V - 16V
- Power consumption: 7.2W

Display unit locations Y22/Y23

S408_032

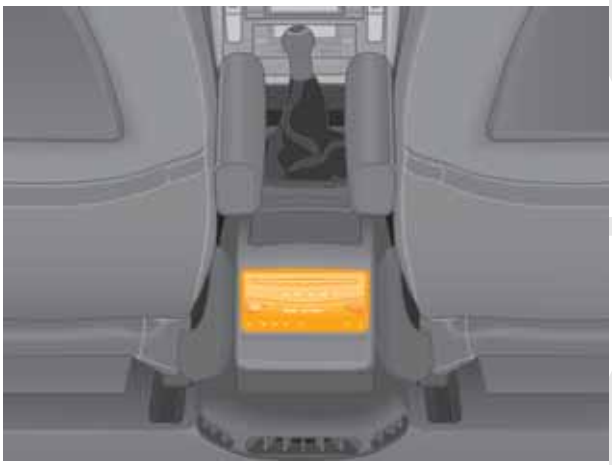
Display unit Y22/Y23

Infrared sensor for the remote control

S408_082

DVD player R7 with connections

Location of DVD player R7 with connections



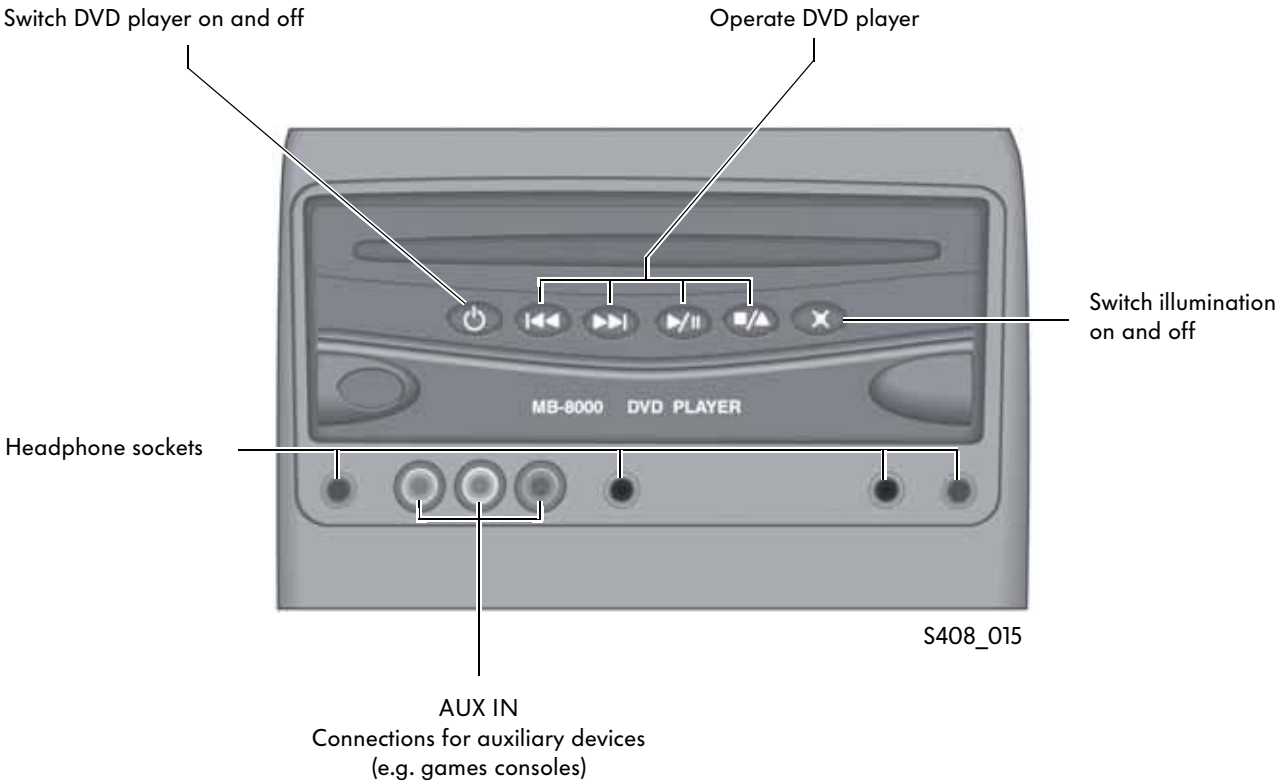
S408_033

The DVD player R7 with connections was specially developed for mobile applications. It is not sensitive to vibrations to a great extent. It is installed in the rear section of the centre console.

Technical details

- Video and audio output
- Video and audio input
- Operated with buttons on unit and also via infrared remote control
- Menu guidance in five languages (D/GB/F/E/I)
- Anti-shock memory
- Dimensions: 148 x 55 x 160mm (WxHxD)
- Temperature range: -15°C to +60°C
- Operating voltage: 9-16V
- Power consumption: approx. 14W

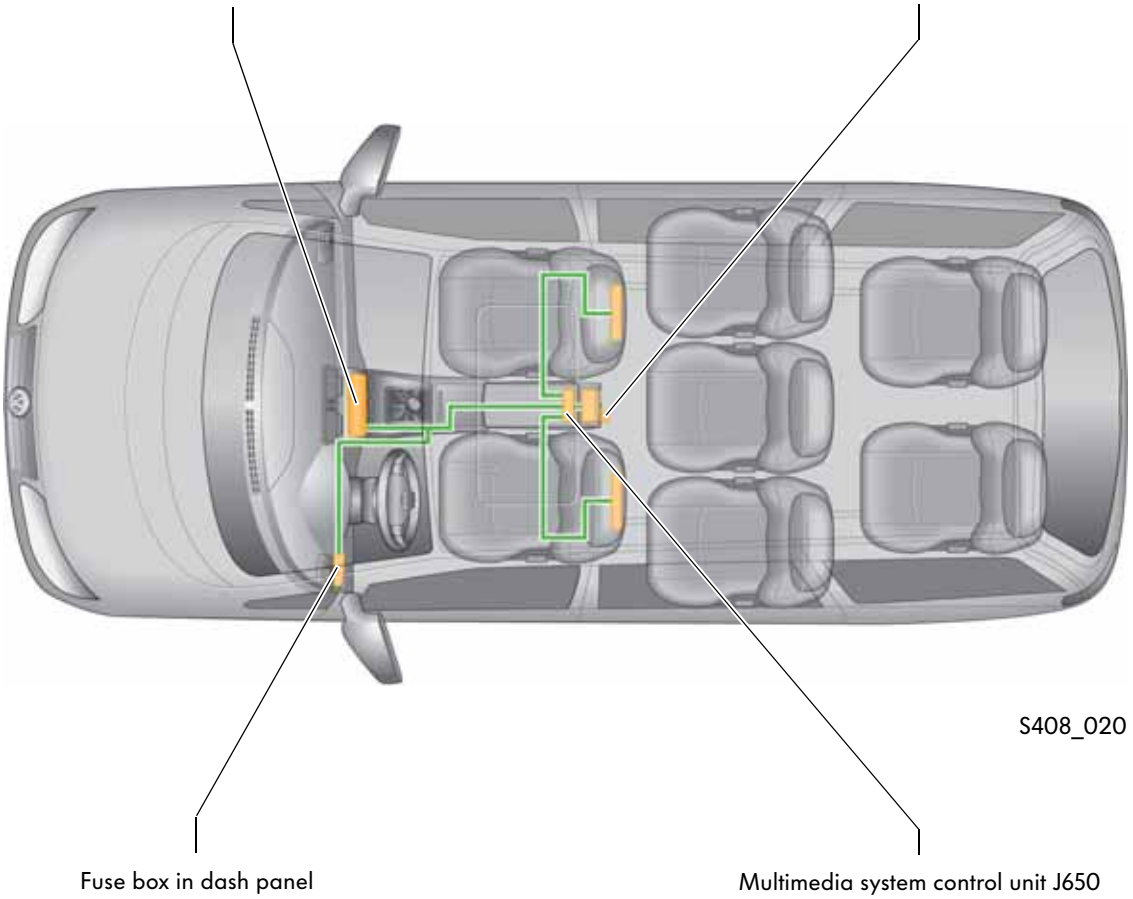
DVD player R7 with connections



S408_015

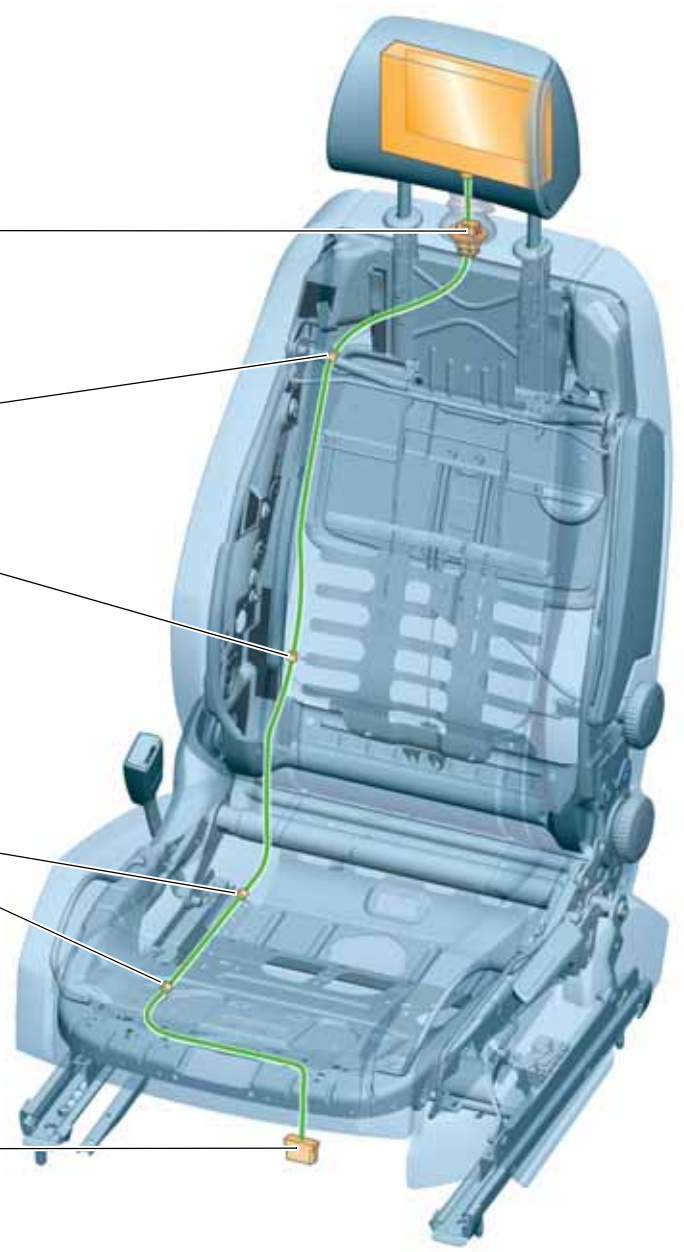
Rear Seat Entertainment (RSE)

Locations of control units in Sharan



Wiring in front seat

The illustration of the wiring shows the driver's seat (principle diagram). The wiring for the front passenger seat is the mirror image.



S408_078

All fuses relevant for the RSE are described in more detail in the "Fuse locations" circuit diagram for the Sharan.

Rear Seat Entertainment (RSE)

Passat 2006/Passat Estate 2006

Display units Y22/Y23

The two 7" LCD screens Y22 and Y23 were specially designed for installation in motor vehicles. They have a high resolution and a wide viewing angle.

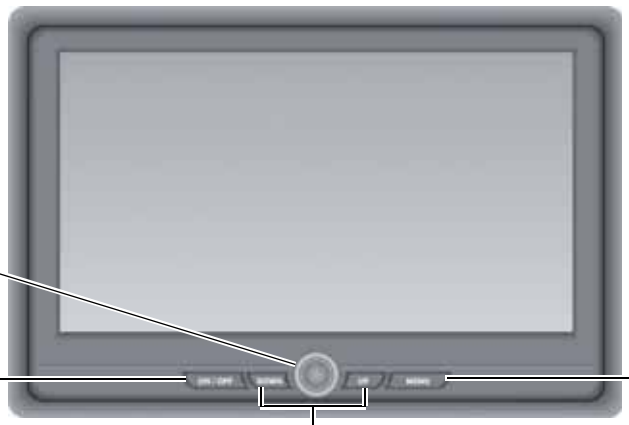
Technical data

- Picture size: 7" (17.5cm diagonal)
  Picture format: 16:9, can be switched to 4:3
- Resolution: 720 x 576 pixels (PAL) or
  720 x 480 pixels (NTSC)
- Viewing angle (top/left/right/bottom):
  60°/60°/ 60°/ 30°
- Settings via OSD: Brightness, contrast, colour, sharpness
- LCD control via infrared remote control
- Dimensions (W x H x D): 179mm x 115mm x 34mm
- Temperature range: -20°C to +65°C
- Operating voltage: 9.5V - 18V
- Power consumption: 6.5W - 8.5W

Locations of display units Y22 (left) and Y23 (right)

S408_036

Display unit Y22/Y23



Infrared sensor for the remote control

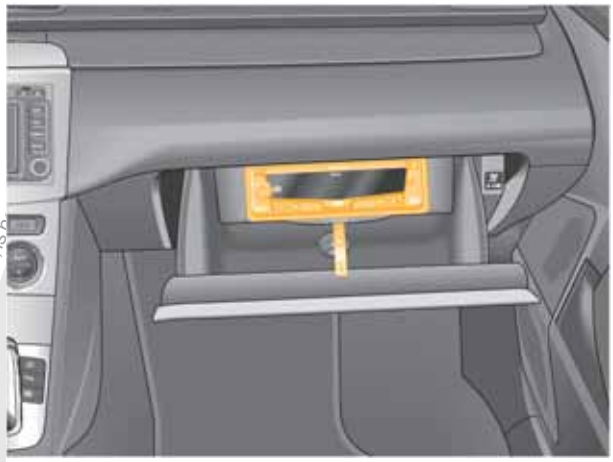
Switch RSE or display unit on and off

- Call up main menu
- Confirm menu selection
- Save settings
- Exit menu

Adjust headphone volumes and menu navigation

S408_007

Location of DVD player R7

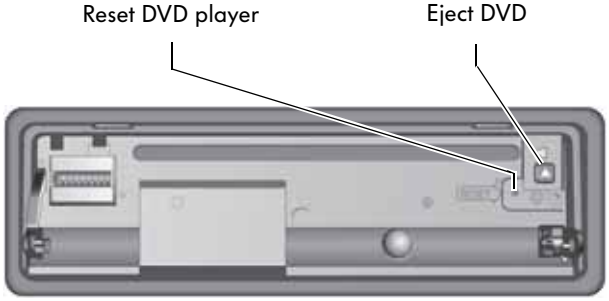


S408_035

DVD player R7

S408_013

DVD player R7 without operating panel



S408_034

DVD player R7

The DVD player R7 in compact 1-DIN format was specially developed for mobile operation. It is not sensitive to vibrations to a great extent. It is installed in the glove component.

Technical data:

- Optical digital output
- Video and audio output
- Video and audio input
- Operated via buttons on the unit, infrared remote control or multimedia system control unit E380
- Menu guidance in four languages (D/GB/F/E)
- Removable operating panel
- PAL/NTSC switchover
- Password function (four-digit PIN code)
- Night-time design
- Anti-shock memory
- Dimensions: (1-DIN) 188 x 59 x 179mm (WxHxD)
- Temperature range: -15°C to +60°C
- Operating voltage: approx. 12V
- Power consumption: approx. 15W

Rear Seat Entertainment (RSE)

Passat 2006/Passat Estate 2006

Additional connections unit for audio and video R176

The additional connections unit for audio and video R176 is equipped with 4 jack sockets (Ø 3.5 mm) for connecting headphones. Two each of these are connected in parallel and assigned to the closer LCD screen.

An AUX IN module with Cinch sockets is also integrated for connecting external units.

Location of additional connections unit R176

S408_037

Additional connections unit R176

S408_014

Socket for headphones (left-hand screen)

Socket for headphones (right-hand screen)

AUX IN
Connections for auxiliary devices (e.g. games consoles)

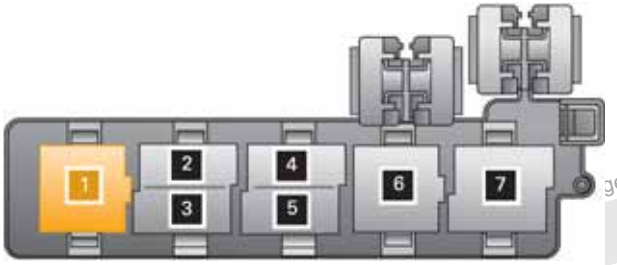
Location of electronics box in the engine compartment

S408_054

Protecting voltage supply for the RSE

The RSE is protected by a 7.5A fuse on the electronics box in the engine compartment. Depending on the version of the electronics box, the RSE is protected at a different connecting point.

Voltage monitoring relay J813



S408_070

Voltage monitoring relay J813

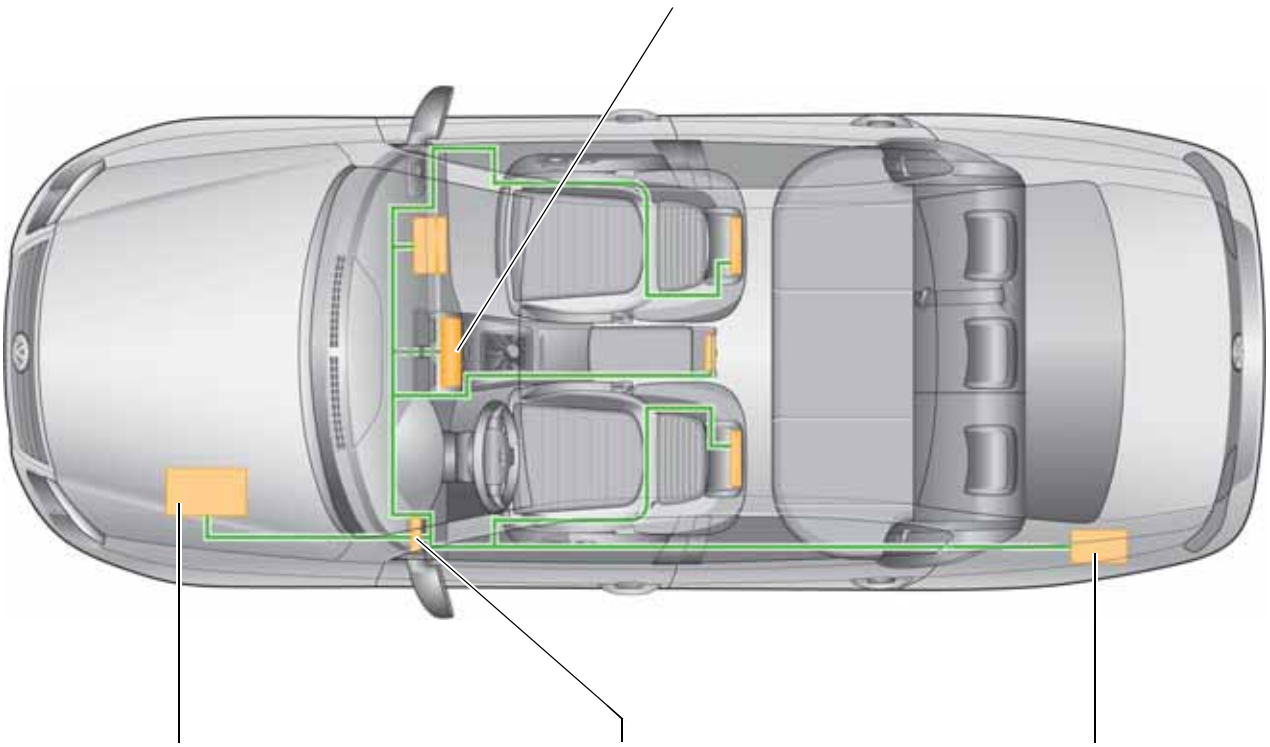
From calendar week 45/07, the voltage monitoring relay J813 is used in the Passat. At the same time, there is no coupling with the control unit with display for radio and navigation system J503 or the radio R.

At voltages below 10.7 volt, the voltage monitoring relay J813 will switch the RSE off after approx. 5 minutes. If the ignition is switched off while the RSE is switched on, the RSE will be switched off after approx. 15 minutes.

The exact location of the voltage monitoring relay J813 is in the “Relay locations” circuit diagram for the Passat/Passat Estate. All other relevant fuses are described in more detail in the “Fuse locations” circuit diagram for the Passat/Passat Estate.

Rear Seat Entertainment (RSE)

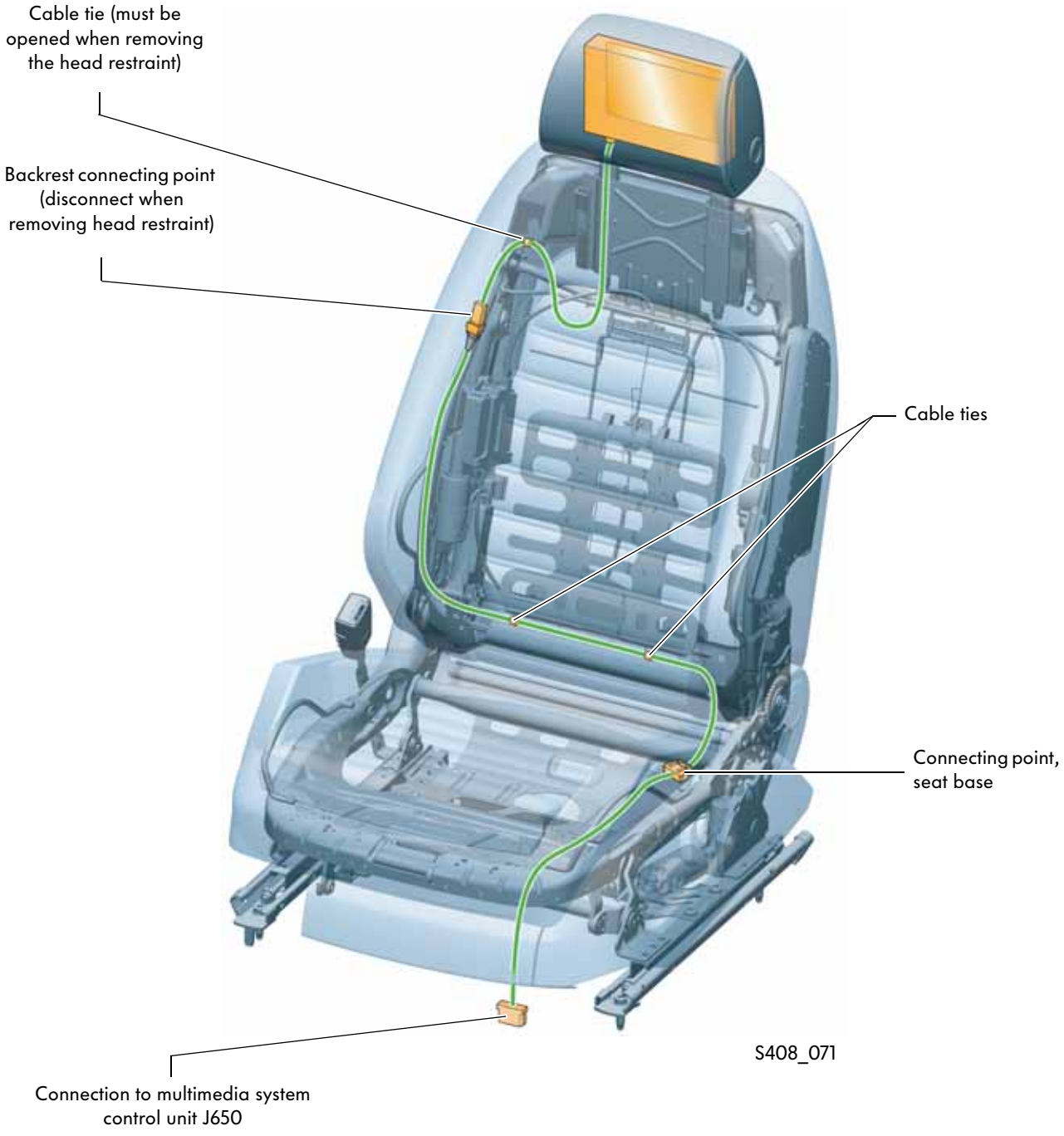
Locations of control units in Passat



S408_018

Wiring in front seat

The illustration of the wiring shows the driver's seat. The wiring for the front passenger seat is the mirror image.



Rear Seat Entertainment (RSE)

Touareg 2003

Display unit Y22

The display unit Y22 is integrated in the roof display unit J702. All settings for the display unit are made via an on-screen display (OSD). The OSD is operated with an infrared remote control. It is displayed and hidden with the “OSD” button on the infrared remote control.

Technical data

- Picture size: 7" (17.5cm diagonal)
- Picture format: 16:9
- Resolution: 480 x 234 pixels (PAL)
- Viewing angle (top/left/right/bottom): 50°/65°/ 65°/ 50°
- Settings via on-screen display (OSD): Brightness, contrast, colour, languages
- LCD control via infrared remote control
- Dimensions (W x H x D): 167mm x 102mm x 17.5mm
- Temperature range: -20°C to +65°C
- Operating voltage: 9V - 16V
- Power consumption: 6.5W - 8.5W

Display unit location Y22

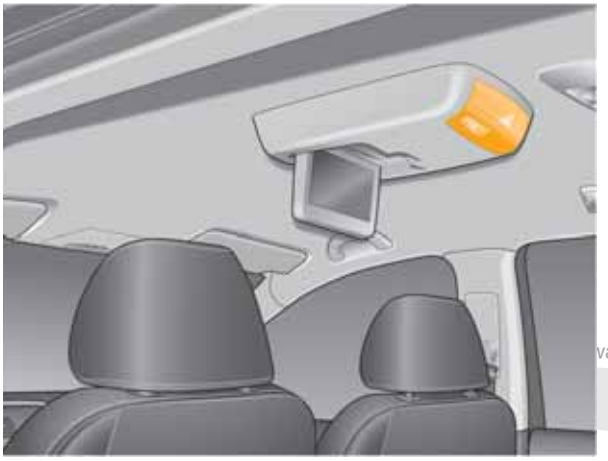
S408_038

Display unit Y22

S408_081

Do not touch the screen! Touching the screen will lead to a temporary deterioration in the picture quality and can even permanently damage the display unit in some cases.

Location of DVD player R7



S408_049

DVD player R7

The DVD player R7 is integrated in the roof display unit J702. All basic functions can be operated using control buttons on the DVD player or using the infrared remote control.

Technical data

- Operated with buttons on unit and also via infrared remote control
- PAL/NTSC switchover
- Operating temperature: -15°C to +60°C
- Operating voltage: 12V

DVD player R7

S408_016

Rear Seat Entertainment (RSE)

Touareg 2003

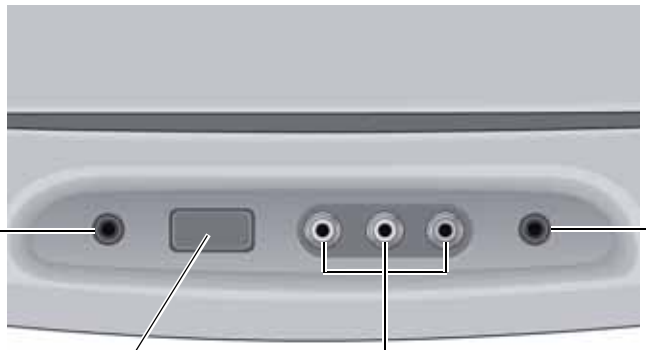
Connections

The connections for two wired headphones and the Cinch sockets for connecting external devices (AUX IN) are immediately in front of the screen in the headliner. In addition there is a button there for switching the RSE on and off.

Location of connections

S408_042

Connections

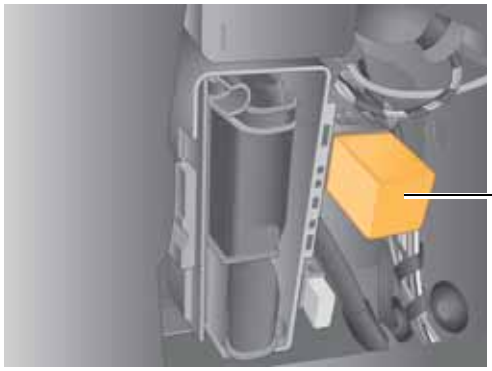


S408_017

Location of fuse holder in luggage compartment

S408_064

Mount for voltage monitoring relay J813



S408_065

Protecting voltage supply for the RSE

The RSE is protected by a 5A fuse and the voltage monitoring relay J813.

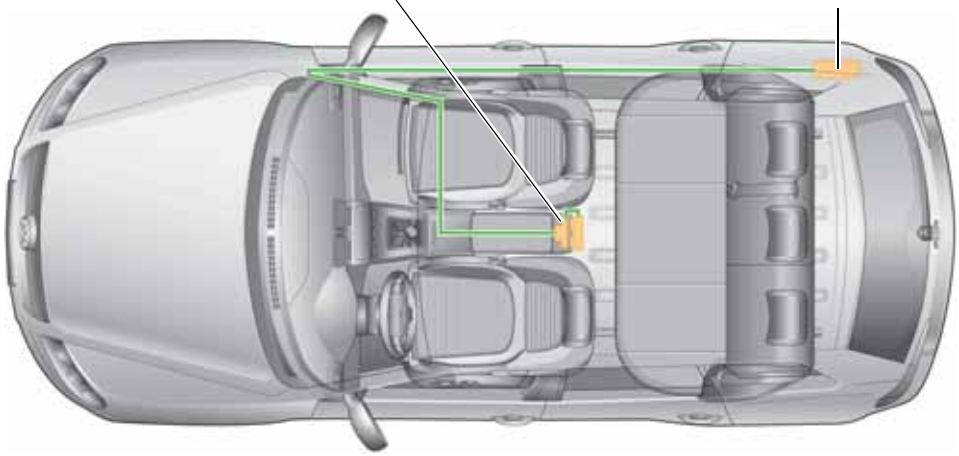
At voltages below 10.7 volt, the voltage monitoring relay J813 will switch the RSE off. When the ignition is switched off and the RSE switched on, the RSE will be switched off after approx. 20 minutes.

Voltage monitoring relay J813 on right-hand side of luggage compartment

Locations of control units in Touareg

Roof display unit J702 with multimedia system display unit Y22

Fuse for multimedia system and voltage monitoring relay J813



S408_019

The exact location of the voltage monitoring relay J813 is in the “Relay locations” circuit diagram for the Touareg. All other relevant fuses are described in more detail in the “Fuse locations” circuit diagram for the Touareg.

Rear Seat Entertainment (RSE)

Phaeton 2003

Display units Y22/Y23

The two 7" LCD screens Y22 and Y23 were specially designed for installation in motor vehicles. They have a high resolution and a wide viewing angle.

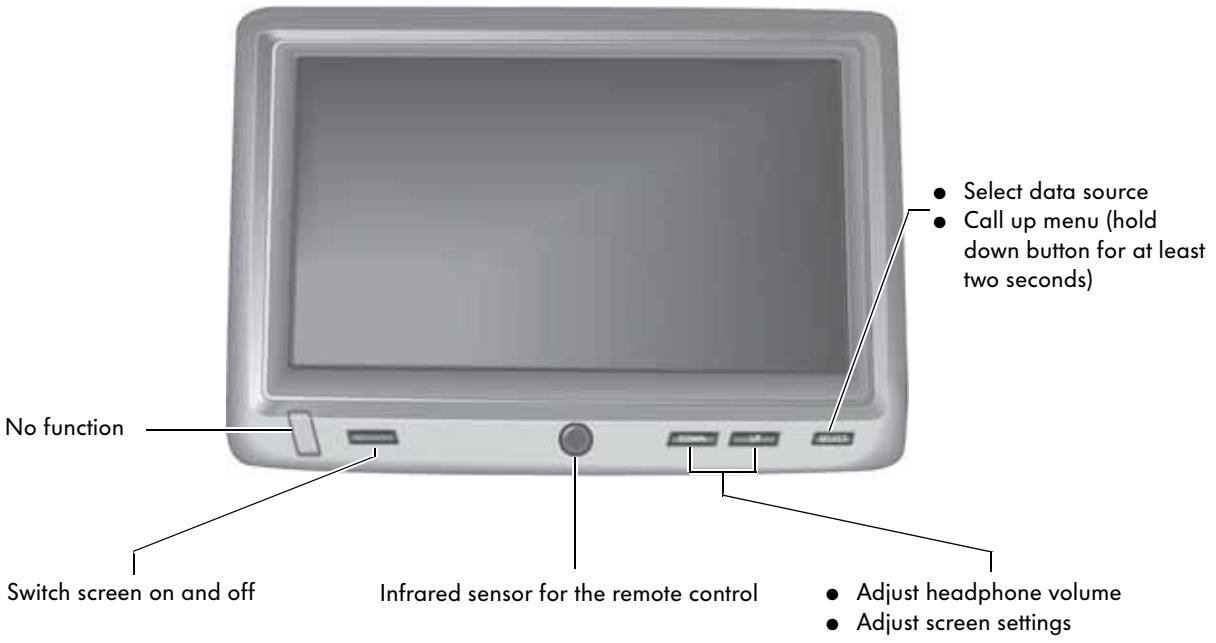
Technical data

- Picture size: 7" (17.5cm diagonal)
  Picture format: 16:9, can be switched to 4:3
- Resolution: 720 x 576 pixels (PAL) or 720 x 480 pixels (NTSC)
- Settings via on-screen display (OSD):
  Brightness, contrast, colour, picture format
- Temperature range: -20°C to +75°C
- Operating voltage: 8.5V - 18V
- Power consumption: 5W - 9W

Locations of display units Y22 (left) and Y23 (right)

S408_039

Display unit Y22/Y23



S408_011

Location of DVD changer R162

S408_012

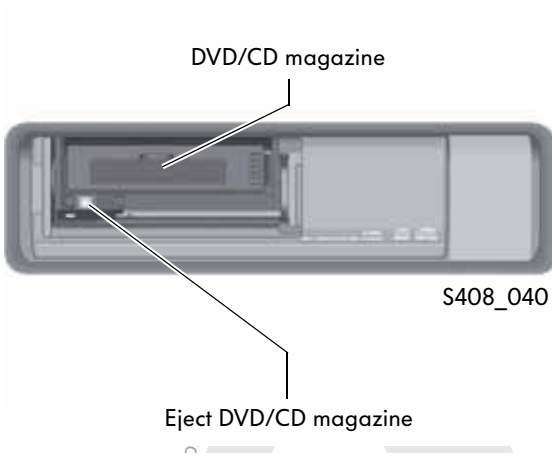
DVD changer R162

The DVD changer R162 is located on the right-hand side of the luggage compartment. Its magazine holds up to six DVDs or CDs.

Technical data

- Can be operated via infrared remote control
- Menu guidance in five languages (D/GB/F/E/CN)
- PAL/NTSC switchover
- Anti-shock memory
- Dimensions: 207 x 80 x 255 mm (WxHxD)
- Temperature range: -15°C to +70 °C
- Operating voltage: 10.8V - 15.5V
- Power consumption: approx. 12W

DVD changer R162



S408_040

Inserting DVDs or CDs in the magazine

When you insert the magazine, the arrow must be on the top. The DVD or CD must always be inserted with the printed side at the top.

Magazine for DVD changer R162

S408_043

Never insert more than one DVD/CD in a single slot!

Rear Seat Entertainment (RSE)

Phaeton 2003

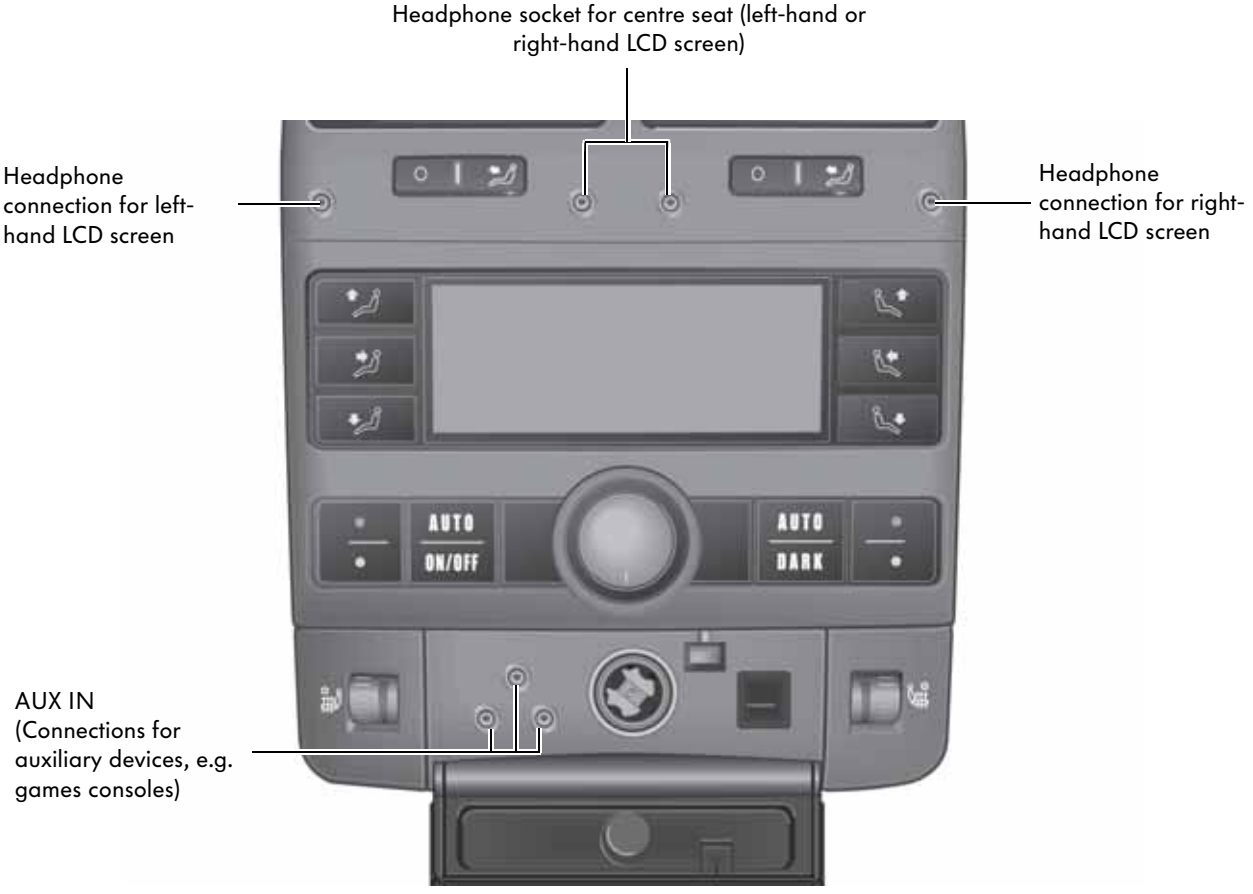
Additional connections unit for audio and video R176

The additional connections unit for audio and video R176 is equipped with two jack sockets (4-seater) or four jack sockets (5-seater). In the 5-seater, two of these are connected in parallel and assigned to the closest LCD screen. Furthermore an AUX IN module with Cinch sockets is integrated for external units.

Location of additional connections unit R176 - 3-seater bench

S408_041

"High-end" connection unit in Phaeton with 3-seater bench



S408_010

Location of additional connections unit R176 - with two single rear seats

S408_079

“High-end” connection unit in Phaeton with 2-seater rear bench

Headphone connection for left-hand LCD screen

Headphone connection for right-hand LCD screen

S408_072

AUX IN
(Connections for auxiliary devices, e.g. games consoles)

Rear Seat Entertainment (RSE)

Phaeton 2003

Protecting voltage supply for the RSE

The RSE is protected by a 7.5A fuse on the additional fuse holder. The additional fuse holder is behind a cover on the left-hand side of the luggage compartment.

Location of additional fuse holder

S408_061

Additional fuse holder on left-hand side of luggage compartment

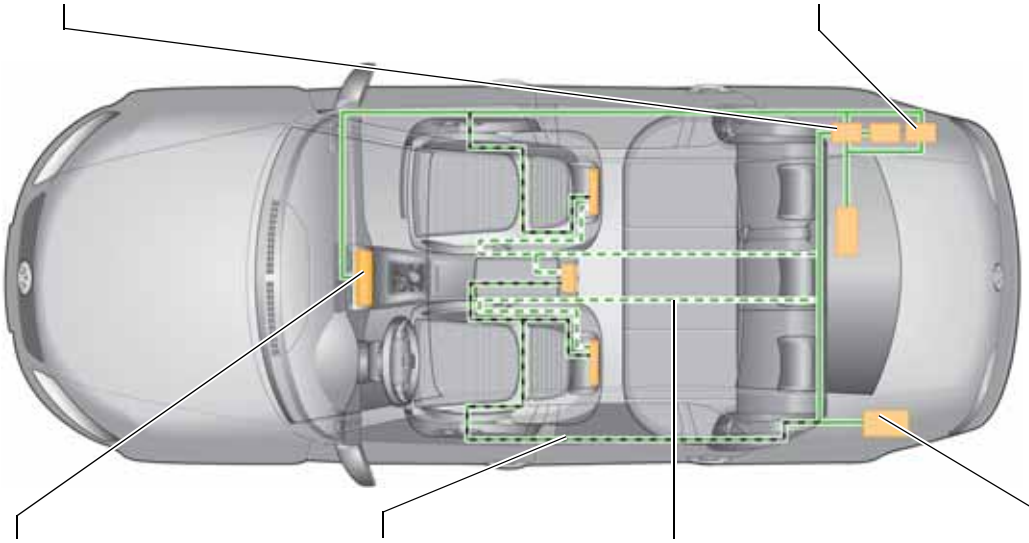
S408_062

All fuses relevant for the RSE are described in more detail in the “Fuse locations” circuit diagram for the Phaeton.

Locations of control units in Phaeton

Multimedia system control unit J650

Multimedia system display units 1 and 2 J744 and J747



Control unit with display for radio and navigation J503 or radio R

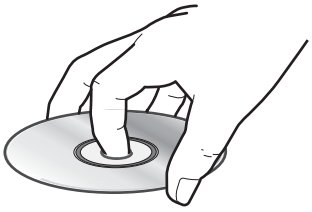
Wiring up to calendar week 45/08

Wiring from calendar week 45/08

Fuse carrier

S408_021

Handling and care of CDs, CD-ROMs and DVDs

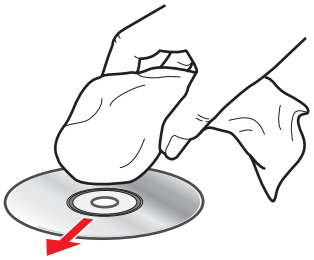


S342_060

Only touch CDs/DVDs by the sides.

S342_061

Avoid getting finger prints on the CD/DVD.

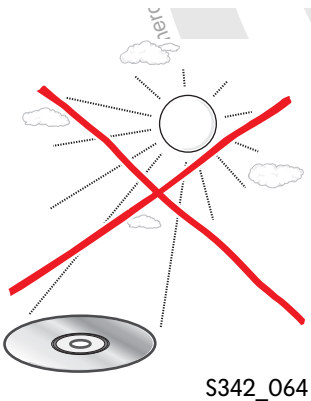


S342_062

Never clean CD/DVDs with a circular motion, instead wipe carefully from inside to outside with a soft lint-free cloth.

S342_063

Handle the CD/DVD carefully both from the underside and from the upperside. Do not write on the CD/DVD. Do not attach any labels.



S342_064

Always keep CDs/DVDs in a protective sleeve. Keep away from excessive heat or direct sunlight.

Glossary

Anti-shock memory

Digital memory buffer that ensures that the DVD player picture and sound are not interrupted even when severe jolts cause the laser to leave its track.

Pages 13, 17, 21, 31

Delta configuration

Delta configuration is the arrangement of the three RGB colour filter elements (red, green and blue) for a pixel in an LCD screen. The colour filter elements are arranged in a triangle (delta).

Page 6

DVB-T

DVB-T stands for Digital Video Broadcasting Terrestrial and refers to the terrestrial broadcasting of television signals in the atmosphere.

Page 5

LCD

Liquid Crystal Display

Pages 5, 6, 7, 12, 16, 20, 22, 26, 30, 32, 33

NTSC

National Television Standards Committee = US television standard, the equivalent of PAL or SECAM in Europe; characteristics: 525 (480 visible) lines and 60Hz refresh rate - compared with PAL 625 (576 visible) lines and 50Hz refresh rate. Because the colour subcarrier frequency is 3.58MHz, NTSC is also known as NTSC 3.58.

Pages 12, 13, 20, 21, 27, 30, 31

OSD

On Screen Display (OSD) is a menu that is overlaid over the screen picture. It is used to operate the unit and modify settings. You can navigate through the menu using buttons on the remote control or on the monitor. The OSD is multilingual in modern units.

Pages 12, 16, 20, 26, 30

PAL

Phase Alternating Line system, or PAL for short, is a colour-encoding system for analogue televisions. PAL is mainly used in Europe.

Pages 12, 13, 16, 20, 21, 26, 27, 30, 31

Which answers are correct?

One or several of the given answers may be correct.

1. What is the task of the multimedia system control unit J650?

- [ ] a) It improves the picture quality of the input signal.
- [ ] b) It is used to connect the video sources, monitors and the operating unit.
- [ ] c) It converts an audio signal from stereo to Dolby Surround.
- [ ] d) It is used to supply power to the connected components.

2. What is an LCD screen?

- [ ] a) A particularly flat picture tube.
- [ ] b) A liquid crystal display screen.
- [ ] c) A display projected onto the front windscreen.
- [ ] d) An analogue display instrument.

3. What statement about the decoupled RSE is correct?

- [ ] a) Audio playback is via the vehicle loudspeakers.
- [ ] b) Audio playback is only via the headphones.
- [ ] c) The system is connected to the radio (R) or the control unit with display for radio and navigation J503.
- [ ] d) The system is portable and can be removed from the vehicle.

Test Yourself

4. What is meant by the PAL system?

- [ ] a) A colour-coding system for analogue television, mainly used in Europe.
- [ ] b) A standard for connectors and sockets on televisions.
- [ ] c) A US television standard.
- [ ] d) An encoding system for audio signals.

5. Which statement about the voltage monitoring relay J813 is correct?

- [ ] a) It protects the RSE against overvoltage.
- [ ] b) It switches the RSE off at battery voltages below 10.7V.
- [ ] c) It regulates the voltage for the RSE at a constant 6V.
- [ ] d) When you turn the ignition off, the RSE is switched off by the voltage monitoring relay J813 after a delay.

6. Which statement about the infrared remote control is correct?

- [ ] a) The infrared remote control transmits radio waves. The level of the amplitude encodes the information.
- [ ] b) The infrared remote control transmits sound waves. The intervals between the waves form the code for the information.
- [ ] c) The infrared remote control transmits a light signal. The intervals between the pulses form the code for the information.

Answers
1. b,d
2. b
3. b
4. a
5. b,d
6. c

Notes

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❀ This paper has been manufactured from pulp bleached without the use of chlorine.